CLARK CANYON AND BEAVERHEAD RIVER WATER QUALITY PROJECT UPDATE

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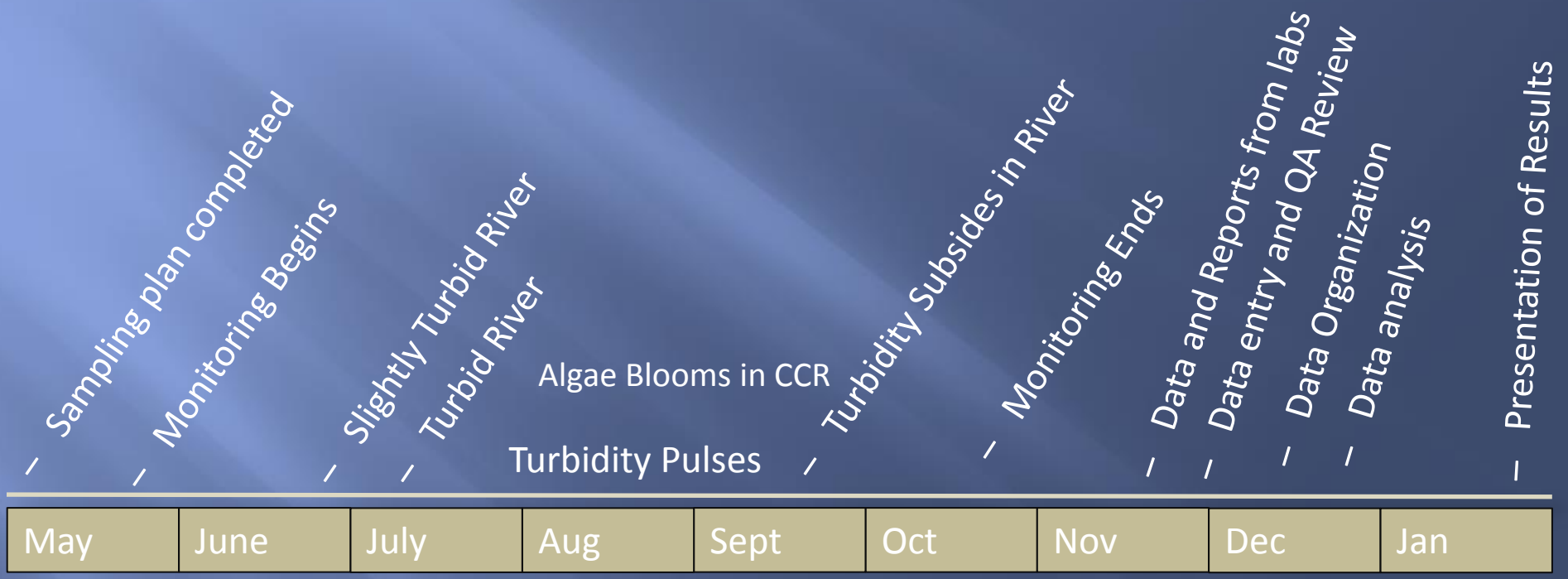
DEQ
Montana Department of Environmental Quality

MONTANA

Timeline of Events

- 2014 - Summer Turbidity Event Occurred – reported to FWP
- 2015 - FWP started monthly monitoring/DEQ began funding support mid season
  - Objective: Characterize condition
  - Nutrients, Chl. a, Common ions, Turbidity/TSS, plus more
- 2016 – DEQ Continued monthly monitoring and added continuous data collection sondes and weather station
  - Objectives: Characterize conditions, determine causes of turbidity

2016 Timeline of Events



2016 Monitoring

- Sites
- Monthly water chemistry and depth profiles
  - Nutrients, Chl. a, Common ions, Turbidity/TSS, plus more
- Continuous monitoring devices
  - Turbidity, Chl. a, temperature, dissolved oxygen, pH
- Turbidity event monitoring
  - Electron microscope, X-ray diffraction analysis
- Weather station

Completed

2016 Objectives

- Characterize nutrient and algae conditions
- Characterize turbidity conditions
- Determine what mechanisms are causing the bottom of the reservoir to be turbid
- Provide information for further discussion about remedies

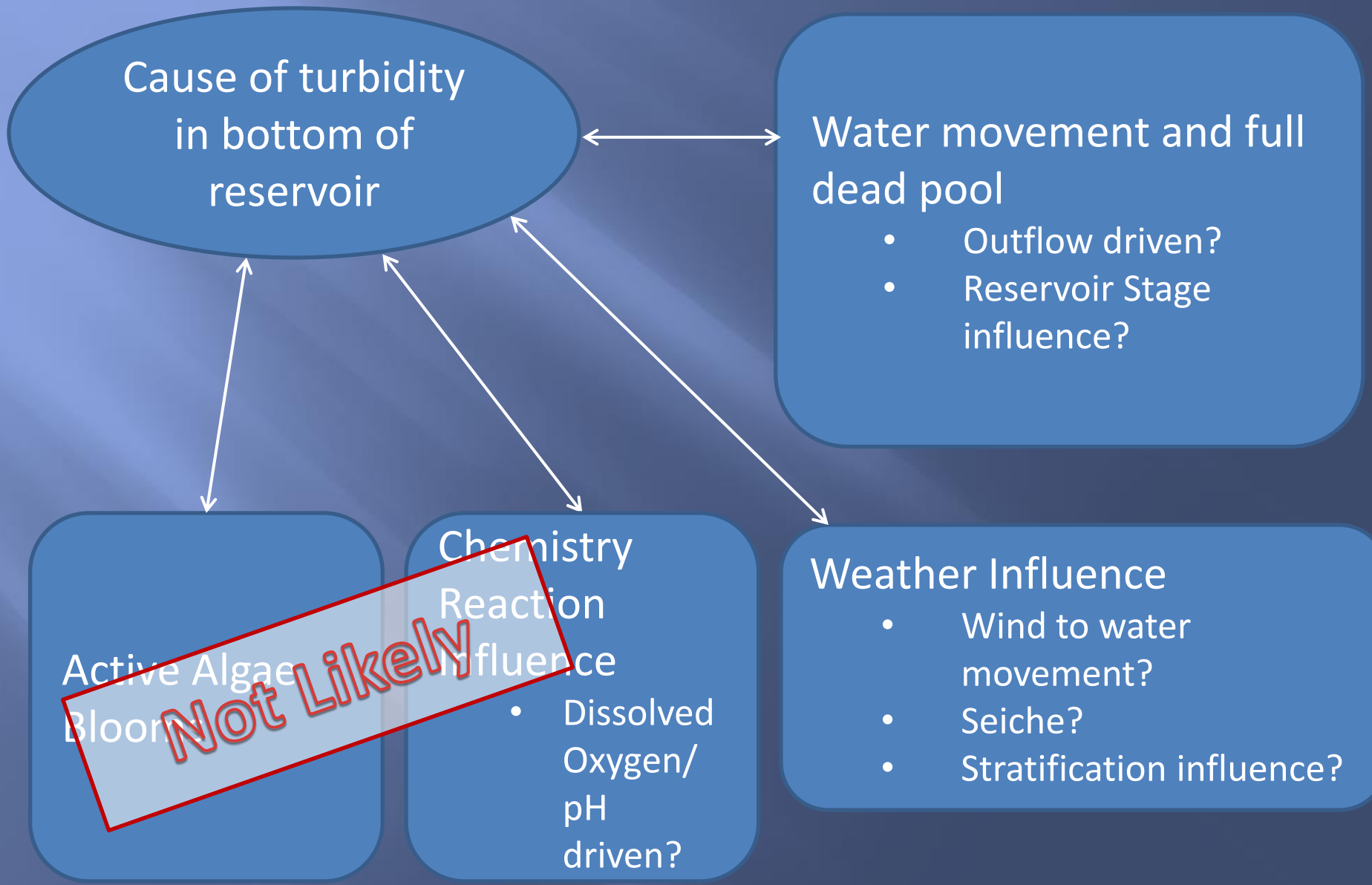
Project Progression

- Water Chemistry Lab
  - Dec 23 - All data is reported to DEQ
  - Data Analysis for condition reports - Ongoing
- Reservoir Turbidity and Sediment Analysis
  - Electron Microscope and X-ray diffraction report
  - Sonde, reservoir physical condition, and weather station correlation analysis
  - Reservoir ion chemistry dissolution analysis

Project Progression

- Technical Review Meeting – Mid January
  - BOR, FWP, DEQ scientists
- Public Meeting – Feb 7th 6:30pm Dillon

Hypotheses Testing



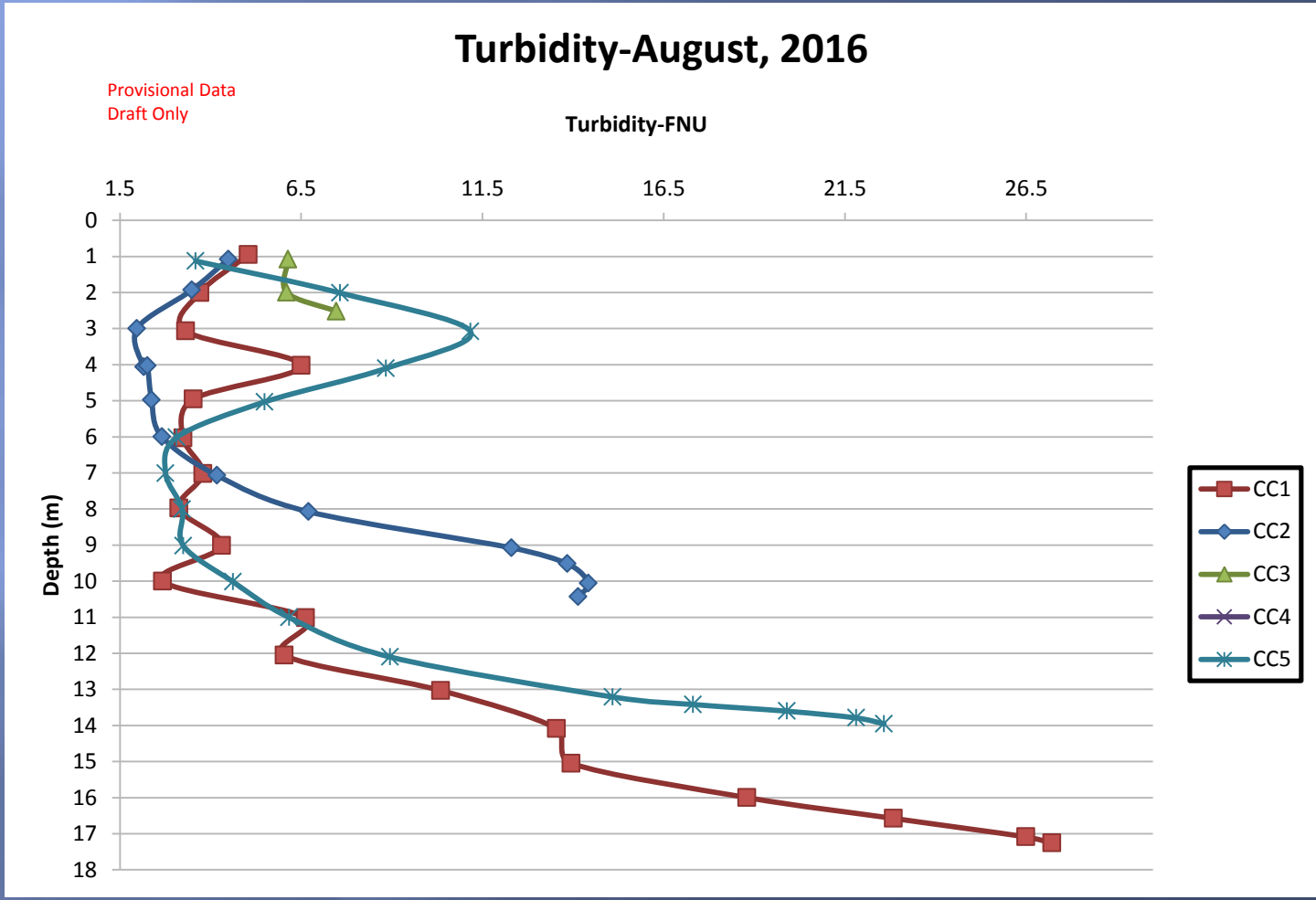
This Year vs Last

	2015	2016
Fully stratified?	Yes	No
Zero DO deep?	Yes	No
Phosphorus release from deep sediment?	Likely	Not as likely
Algae Bloom?	Yes	Yes
Blue-Green Algae?	Yes	Yes
Turbidity event?	Yes	Yes

- Internal nutrient cycling from sediment likely not the only driver of algae blooms
- Active algae blooms not significantly contributing to Beaverhead River Turbidity

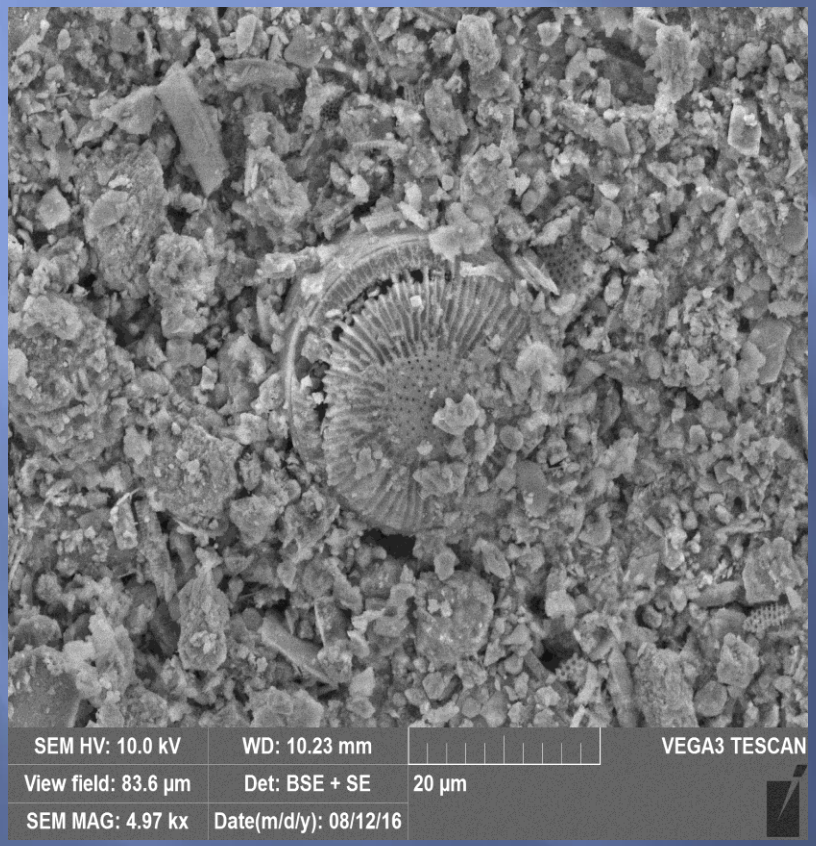
Preliminary

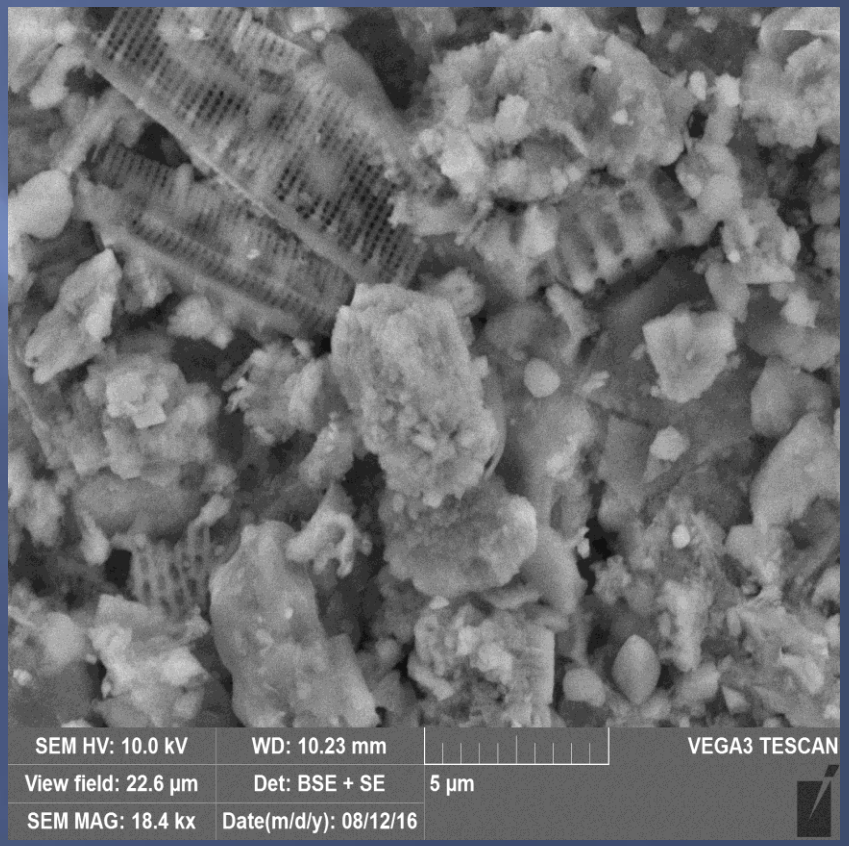
Turbidity Analysis



Turbidity Analysis

- Preliminary results for filtered turbidity

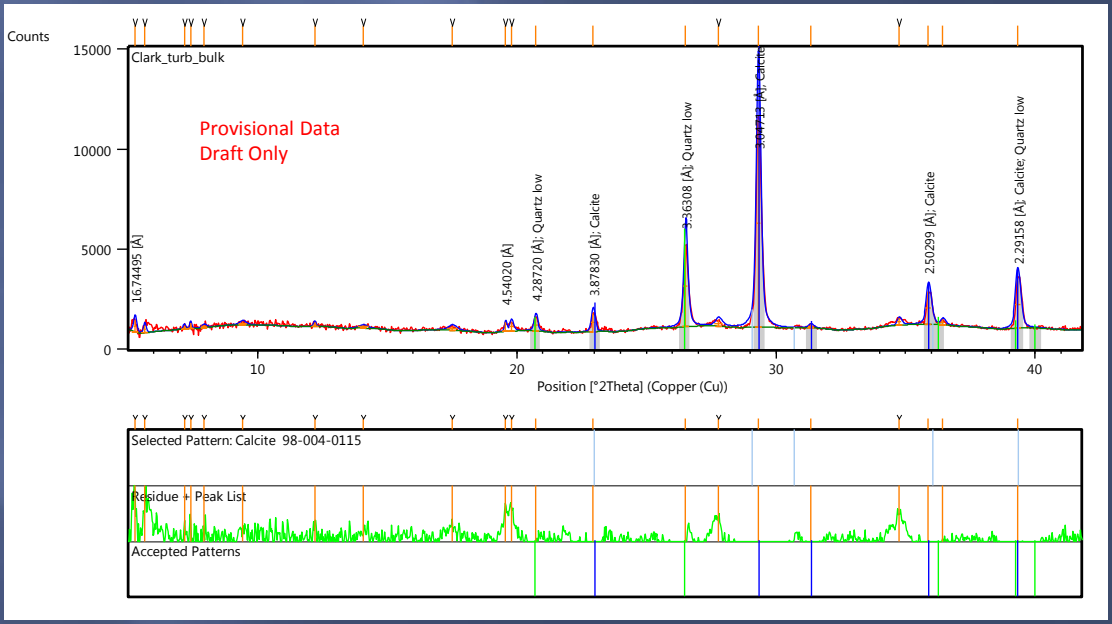




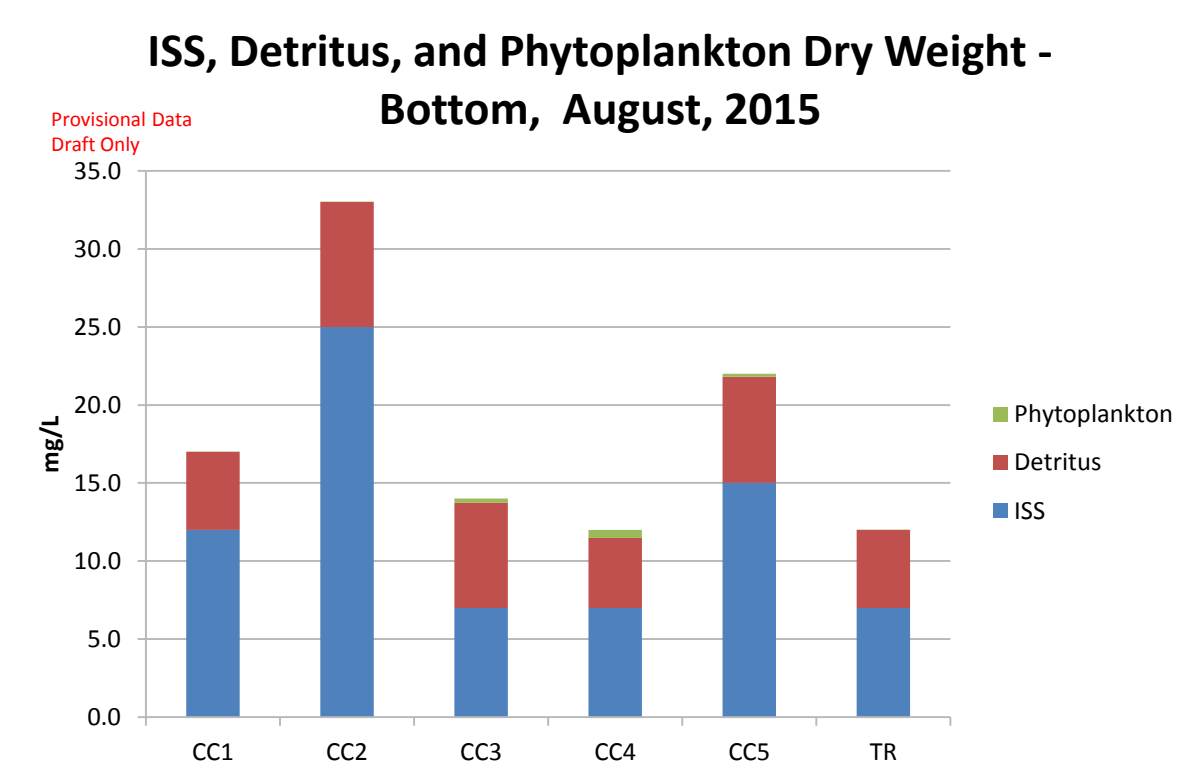
Electron microscope analysis showed the material to be dominated by diatom fragments and fine sediment.

Turbidity Analysis

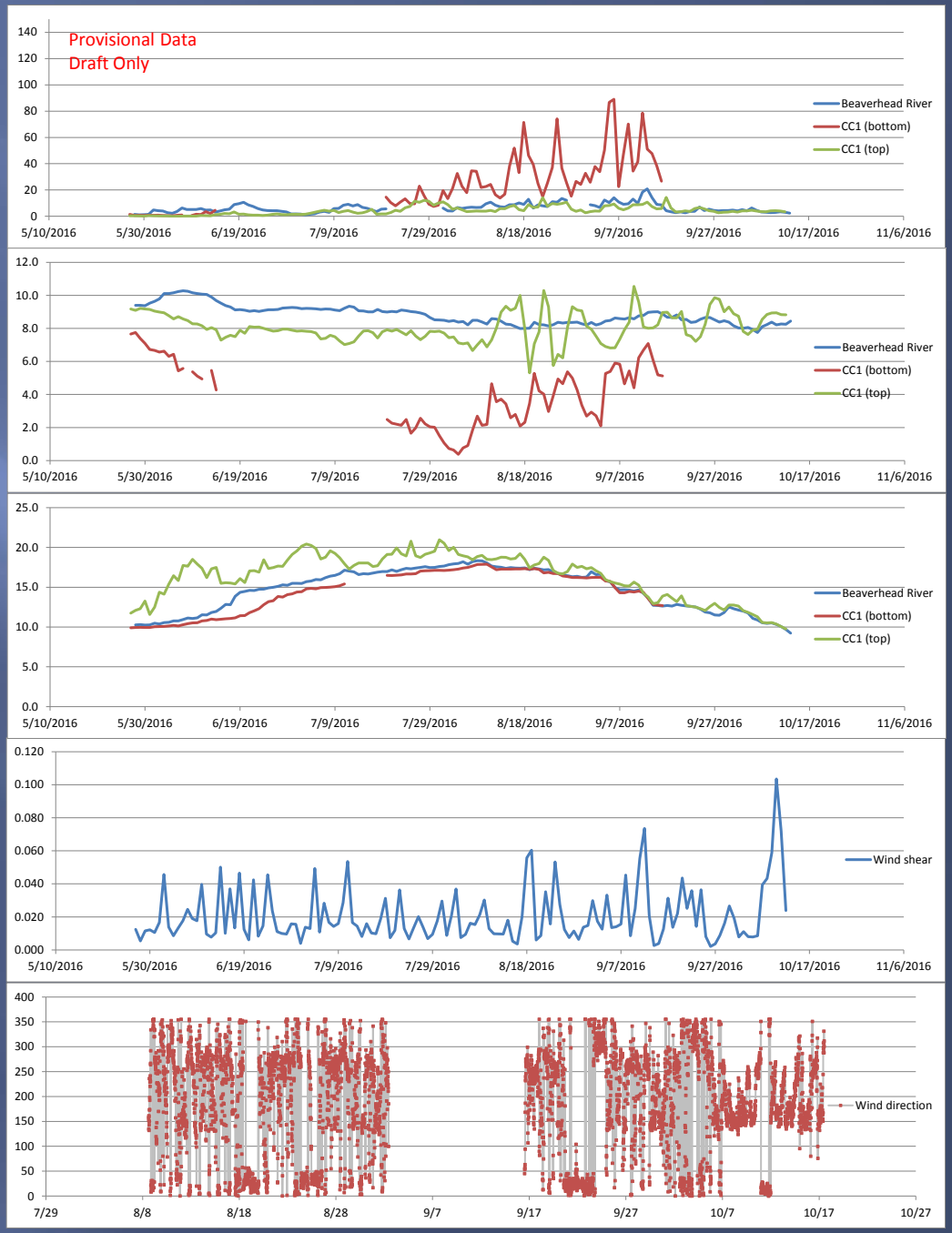
- A draft report from the Georgia State Dpt. of Geosciences preliminarily concludes that the turbidity is lake bed sediment but pending a bulk EDS (Energy Dispersive Spectroscopy) to verify the elemental composition of the material since X-ray diffraction can not detect silica and calcium carbonate.



Turbidity Analysis



Turbidity Analysis



Project Progression

- Technical information provided via presentation in early February and a report by early spring

Questions?

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